SPRUCE BUDWORM CONTROL PLAN
FOR 1953 & 1954
MONTANA AND NORTHERN IDAHO

Report of Task Force Representing
Timber Industry
Bureau of Entomology and Plant Quarantine
and
U. S. Forest Service
of the
U. S. Department of Agriculture
January 1953
Missoula, Montana

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SPRUCE BUDWORM CONTROL PLAN FOR 1953 & 1954
IN MONTANA AND NORTHERN IDAHO

The Problem

A survey made by the personnel of the Bureau of Entomology and Plant Quarantine, Division of Forest Insect Investigation during the season of 1952 indicated there are nearly 2 million acres of forest land infested with the spruce budworm at present. The intensity of the infestation varies from 1,700,000 acres of light to 73,000 acres of moderate and 132,000 acres of heavy infestation. Table I shows location of the 1952 spruce budworm infestations and a comparison with 1951 conditions.

During the past 30 years, numerous outbreaks of the spruce budworm have been reported in the Douglas-fir and white fir forests throughout the region. Many of these outbreaks flared up and then subsided abruptly in a few seasons. Other outbreaks have persisted for 10 years or more and have resulted in a loss of increment and a heavy loss of trees through mortality. The damage by the early infestation of the spruce budworm was recognized but no method of control had been developed for large forested areas and land management agencies were forced to accept these losses.

During the past four or five years widespread budworm epidemics have erupted again in the Douglas-fir and true fir forests in this region. With increased stumpage, watershed, recreation and Christmas tree values in the present day it is a matter of grave concern that the spread of the budworm be controlled.

Beginning in the year 1947 a method of aerial spraying was developed which successfully controlled the spread of the tussock moth in northern Idaho. Beginning in 1949, success has been achieved by aerial spraying for the control of budworm for four continuous years in Oregon and Washington. A total of 2,600,000 acres has been treated in these two states with only 9,000 acres loss from mortality. Already, in this region, we have lost this amount of acreage through mortality. It is almost certain our losses will be greater unless something is done to control the budworm in heavily infested areas where defoliation has been continuous for five years. One drainage alone on the Helena Forest has a total tree mortality on 5,000 acres.

There has been a tendency to hold back in our treatment for control of spruce budworm. We have had hopes that the epidemic would subside without artificial control measures as it has in the past. However, this has not been the case. The acres of budworm infested areas have been on a constant increase for the past four years. If the budworm epidemic is allowed to go unabated, it is likely to build up to the point in Douglas-fir and true fir forested areas to where widespread killing will take place. On the other hand, there is a remote possibility that the budworm infestation will subside without too severe damage

being done. Can we afford to gamble on the possibility that the present widespread infestation will subside very soon? All indications point to an upward swing.

Because of the wide-spread and the immense area of the present infestation in the region it is not feasible to treat the whole area of the present infestation in one year. Within the lightly infested areas there is a possibility that the spruce budworm will subside of its own accord through natural means such as adverse weather or the feeding of parasites upon the budworm.

It is proposed that in the first year program to spray only those areas where the defoliation is moderate to severe with some tree killing in progress and where general tree killing is probable next year.

Values Protected

Values to be protected in the spraying of DDT for the control of the spruce budworm are:

1. Stumpage values - the value of Douglas-fir and white fir for stumpage has increased in the immediate past few years from a practically negative value to prices as high as 10 to 15 dollars per thousand board feet on the stump. After the logs are converted to lumber and other products the value has increased to as high as seventy to ninety dollars per thousand board feet. The logging and the conversion to lumber involved the employment of many people within the region who are dependent upon the industry for their bread and butter and other essentials of life.

2. Watershed values - it is impossible to express the value of trees for watershed protection in terms of dollars, but the values are there, nevertheless. The trees on watershed areas are important to irrigation on farm lands below. A tree cover on the uplands retards the flow of the water during the spring run-off and form a protective mantle for the thin soils which are characteristic of most mountainous areas. One of the major premises upon which the national forests were created was for watershed protection. We have invested approximately 50 years of fire control and improvement money on watershed protection and we cannot afford to let the spruce budworm destroy the timber stands after this many years of protection. Continuation of the budworm outbreaks would seriously threaten this investment in fire protection. Forest destruction is justifiable only when the land has a greater permanent value for other uses.

3. Recreation values - recreation value of trees also have economic significance not expressible in dollars. In Montana east of the Continental Divide the Douglas-fir forested areas are important recreation centers. The national forests are used for picnic areas, summer homes, fishing, hunting, winter sports and other recreational uses.

Another important factor in determining whether or not to treat for the control of the spruce budworm is the increased fire hazard created by the defoliation of the trees. Also, there is the risk created by the weakening of defoliated trees which make them easy prey for attack by bark beetles.

Accomplishment of Previous Spruce Budworm Control Work in Oregon, Washington and Montana.

In Oregon and Washington approximately a total of 2,600,000 acres of the most critical areas of epidemic infestation has been treated over the past four years by aerial spraying for the control of spruce budworm. The acreage of completely dead timber resulting from defoliation by the spruce budworm has been confined to approximately 9,000 acres. The build-up of tree killing bark beetles in trees attacked by the budworm also has been kept to a minimum. The epidemic has been kept from spreading extensively in the sprayed areas in spite of a strong tendency for the budworm to increase on unsprayed areas. Valuable watersheds have been protected and a potentially great fire hazard averted.

In Montana on the Bitterroot National Forest a 12,000 acre block of Douglas-fir type was sprayed for spruce budworm control in 1952. Further defoliation in this block of timber would have resulted in extensive tree mortality. From all indications the project was highly successful in reducing the population of budworms in the area treated.

1952 Summary Results

The 1952 spruce budworm conditions in the northern Rocky Mountains are characterized by a widespread increase in area of most existing infestations, and extensive tree damage along the eastern slope of the Continental Divide in central Montana.

A comparison of the occurrence of budworm infestation throughout the region in 1952 and 1951 conditions shows the total infested acreage in 1952 was 1,901,050 compared with 1,166,000 in 1951 or an increase of 735,000 acres for 1952. Included in the total infested areas are nine national forests, one national park, and several thousand acres of private land. (See Regional map at back of report as to location of infested areas.)

Each year since 1949 budworm infestations in the northern Rockies have shown a great increase in both area and intensity. In the centers of several infested areas the year 1952 marked the third

and fourth years or more of heavy feeding. The effects of this feeding is visible in a decided lack of foliage on the larger trees in the overstory, top killing on intermediate trees, and the death of smaller trees in the understory.

Recommendation for 1953

Helena National Forest. (See map of Helena National Forest at back of report.)

1. Continental Divide, East Slope Unit.

Extent of Infestation - Nowhere in the region have budworm outbreaks been more widespread or damaging than those on the east slope of the Continental Divide. Heaviest damage was noted in the vicinity of Marysville. Other areas of heavy infestation are Lump Gulch, Clancy Creek, Prickly Pear and McClellan Creek. Areas covered by heavy and moderate infestations is 108,980 acres. It is proposed to treat this many acres in 1953.

Ownership - Ownership within the proposed areas to treat consist of 55 percent private lands and 45 percent federally owned lands.

Values at Stake - The Helena National Forest is principally a protection forest. There are 14,000 acres of Site V or better suited for commercial timber growth within the area proposed for spraying. The average stand per acre is 10,000 board feet and the present average stumpage value is $4.00 per M, making an average value of $40.00 per acre. This times the area of 14,000 acres equals $560,000. Better than 50 percent of this value is a representation of future values and to get a true present value would require discounting.

Watershed values have economic significance not expressible in dollars. We have invested approximately 50 years of fire protection and improvement money on the area and we cannot afford to let the spruce budworm take over the stands after this many years of protection. Continuation of the budworm outbreak would seriously threaten this investment in fire protection. Forest destruction is justifiable only when the land has greater permanent value for other uses.

The area has a value for recreational use; numerous summer homes are located within the area. Recreation experts have said that the value is great enough to spend $1.20 per acre for protection from the spruce budworm.

Public sentiment is strongly in favor in some method of control. People are fully conscious of the spruce budworm infestation -- particularly that area located in Colorado Gulch.

Soil Erosion is a serious problem in the Helena for the soil is thin and very erodable.

Plan of Work

Control will consist of aerial spraying of the infested area with a DDT solution. Center of operation will no doubt be at the air field at Helena, Montana. There is a possibility of using some smaller air fields closer to the areas to be treated.

Estimated Cost - the 1952 spruce budworm control operation on the Bitterroot Forest cost an average of $1.18 per acre. It is the concensus of opinion that the area under consideration can be treated with an average cost of $1.20 per acre including all expenditures such as the construction of temporary air fields.

108,980 acres at $1.20 = $130,776.00

2. Big Belt Mountains Unit.

Extent of Infestation - Budworm outbreaks with considerable fluctuations in intensities have persisted on one portion or another of the Big Belt Mountain Range for many years. In a few drainages, Douglas-fir stands covering entire mountain sides have been killed. An increase in the intensity was noted in 1952. A total of 11,250 acres in the Magpie Creek and Deep Creek drainages have a moderate amount of damages due to the budworm infestation. It is proposed to treat these two areas in 1953.

Ownership - Ownership within the two areas is 90 percent Forest Service. The private land area is 10 percent of the total.

Values at Stake - The values at stake are very similar to those indicated under the East Slope of the Continental Divide Unit. There are merchantable timber areas along creek bottoms which have been killed or subject to being totally defoliated. Commercial timber volumes on the Helena Forest is a scarce commodity and what volumes the people have available to them should be protected.

Plan of Work - Control of the budworm in the area will consist of aerial spraying with DDT in solution at the rate of one pound per acre. Center of operation will be the nearest available air field which would be Helena for the Magpie Creek section and Townsend for the Deep Creek section.

Estimated Cost - An average cost figure of $1.20 per acre for treatment for budworm was used. This figure is derived from past experience and past performance.

11,250 acres at $1.20 = $13,500.00

Deerlodge National Forest. (See map of Helena National Forest at back of this report.)

1. Boulder District Unit.

Extent of Infestation - Heavy damage, similar to that on the Helena National Forest, was observed around Boulder, Montana, including the drainages of Whitetail Creek, Little Boulder River, McCarty Creek. Area covered by heavy and moderate degree of damage is 40,800 acres.

Ownership - Fifteen percent private land; balance Forest Service ownership.

Values at Stake - The infested area is mainly a protection forest with some commercially valuable timber involved. Stumpage values average $4.50 per thousand board feet. Other values are primarily the same as for the Helena Forest.

Public reaction is strongly in favor of this project for the defoliation is very noticeable to the people of the town of Boulder. Editorials have been printed about defoliated conditions of the trees by the local paper.

Plan of Work - Aerial spraying of the heavy and moderately infested areas is recommended for the spring of 1953. Work center for the operation will be located near the town of Boulder. The infestation is located on all sides of the town.

Estimated Cost - Estimated cost per acre is $1.20.

40,800 acres at $1.20 = $48,960.00

2. Whitehall District Unit.

Extent of Infestation - Moderate damage extends over the drainages of Beaver Creek and Bigroot Creek and covers an area of 6,910 acres.

Ownership - All government ownership.

Values at Stake - Values are in the main the same as for the Boulder Unit. The Whitehall Unit is a continuation of the Boulder Unit.

Plan of Work - Aerial spraying of the infested area is recommended for the spring of 1953. Work center for the operation is located near the town of Boulder.

Estimated Cost -

6,910 acres at $1.20 = $8,292.00.

Nezperce National Forest.

1. Salmon River Unit.

Extent of Infestation - For the past six years a budworm outbreak has existed on the Salmon River District, west of Riggins, Idaho. Due to fluctuations in intensity of the infestation from year to year only a small amount of mortality has occurred in the past. However, in 1952, the infested acreage more than doubled that of 1951, totalling over 58,000 acres. The amount of damage to Douglas-fir and white fir has increased considerably.

Two centers of heavy damage are in Bean Creek and Papoose Creek drainage. In the former drainage top killing of intermediate trees and mortality of smaller trees extended over nearly 7,000 acres. An additional 3,000 acres were classed as having moderate damage where tops of trees have been stripped but were not yet dead. In the latter drainage trees in the understory have suffered heavy damage over nearly 4,000 acres, with moderate damage occurring over an additional 2,000 acres.

It is recommended that the total of 15,360 acres of heavy and moderate damaged trees be treated for spruce budworm control.

Ownership - Ownership within the area to be sprayed is 99 percent Forest Service and one percent private.

Values at Stake - Within the heavy and moderate damaged area there is a volume of merchantable Douglas-fir and white fir amounting to approximately one hundred million board feet which is threatened by the budworm unless control measures are taken. This volume represents a stumpage value of $600,000.00 at the average stumpage rate of $6.00 per thousand board feet.

Other values represented by the trees are watershed, recreation, and soil erosion prevention.

Partial defoliation causes loss of increment which is reflected in longer rotations and less productivity per acre.

Plan of Work - Center of operation will be Grangeville unless a closer air base can be found which is desirable, as Grangeville is farther away than required for an ecomonical operation, particularly for the Papoose Creek area.

Estimated Cost - the estimated cost at $1.20 per acre will be $18,432.00.

Overall Cost and Acreage Figures

Total acreage to be treated	183,300
Total cost for spraying	$219,960.00

Recommendation for 1954

There are Christmas tree areas of Douglas-fir which have already been infested by the spruce budworm on the Lolo, Deerlodge and Flathead and Bitterroot National Forests. These and possibly other forests in the region have the problem facing them of saving their Christmas tree business. The capitalized value of good Christmas land runs from $50.00 to $100.00 per acre with a sustained annual return of $5.00 to $10.00 per acre where the crop and land are managed properly. In the commercial timber and forest protection areas it is safe to wait through five years of defoliation without suffering severe damage before control measures are started; however, in Christmas tree areas it is desirable to prevent the initial attack. After the budworm has once infested an area almost two years defoliation will take place even though control action takes place as soon as possible after discovery. During the first year of discovery of an infestation it is too late usually to do any control work and in the following year when control action is started 75 percent of the current years needle have been consumed or destroyed by the budworm before the budworm is exposed enough to do effective work with the DDT spray. The Christmas tree crop is not entirely lost but it reduces the number of Christmas trees available for market for three or four years. This is a serious financial loss to the Christmas tree operator.

Christmas tree distributors are concerned about the extensive and heavy damage which the spruce budworm is inflicting upon private and federal owned lands which supports stands of Douglas-fir that are highly desirable for the production of Christmas trees.

In the vicinity of Drummond, Montana, one large operator anticipated a harvest of 50,000 trees on federal lands in 1952; the actual cut was only 15,000 trees for the 1952 season. Part of this reduction was attributed to weather and lack of access roads; but the large majority of the loss was due to the defoliation by the spruce budworm.

In this same district the story is repeated in a worse scale on private lands; e.g., 10,000 trees out of an estimate of 50,000 and less than 10,000 out of an estimated 30,000 trees. This loss of trees was due entirely to the spruce budworm.

It is the intention of the 1953 program to knock down all the serious "hot spots" in the region and in the 1954 program to do some extensive control work in the Christmas tree areas and also to further reduce any heavy and moderate damage by the spruce budworm that are likely to develop from present light damage areas between the 1953 and 1954 control measures.

With these objectives in view the following program of control for 1954 is recommended:

National Forest	Acres to be Treated	Percent Private Land
Lolo	55,000	10
Deerlodge	125,000	40
Helena	85,000	50
Beaverhead	10,000	60
Bitterroot	35,000	1
Lewis & Clark	10,000	60
Flathead	20,000	40
Nezperce	15,000	1
Gallatin	15,000	10
Craig Mtn. Area	10,000	100
Total	380,000	

380,000 at $1.20 per acre = $456,000.00

Planning Work for the 1954 Program

To plan accurately and well for 1954 program of budworm control, intensive detection and appraisal surveys will be required to determine extent of moderate and heavy infestations, Christmas tree areas in need of treatment, values at stake, ownership, and estimated cost of control work.

It is estimated 20 man-months will be required at $600.00 per man-month. This includes salaries, equipment, material, travel and supplies. Twenty times the $600.00 equals $12,000.00 required for planning.

Total estimated cost for the 1954 program equals - $468,000.00

Apportionment of costs and Project Administration

The amount of cooperation that can be expected from private owners and other state and federal agencies has not been explored fully but steps are being taken to obtain cooperation.

The State of Montana has not as yet passed a pest control law, although it has been recommended by the State Board of Forestry. Early enactment of a pest control law for Montana is recommended for it would qualify the state for benefits under the Pest Act. No set formula for proportional sharing of cost has been developed; but it is felt that the federal government should not be expected to bear more than one-third the cost of control on private lands and the state assume the whole burden on their own lands. An exception could be made in case the pest might be eradicated or contained in a small area by prompt action before state and private help is available.

The State of Idaho has a pest control act on its books. The matter of apportionment will have to be worked with the state officials.

Project administration will be mainly Forest Service responsibility for the 1953 program unless either state is willing to assume some of the responsibility.

Table I. Acreage of 1952 spruce budworm infestations and a comparison with 1951 conditions, northern Rocky Mountains.

	Total Acreage		Degree of Damage--1952		
	1951	1952	Light	Moderate	Heavy
IDAHO					
Nezperce Natl. For.	20,500	58,620	43,260	4,860	10,500
Craig Mtn. (Waha, Idaho)	9,200	129,440	126,440	2,000	1,000
Lolo Natl. Forest (Powell District)	23,700	80,380	73,460	1,540	5,380
Sub-totals	53,400	268,440	243,160	8,400	16,880
MONTANA					
Lolo Natl. For. (Bonita District)	1,600	47,360	47,360		
Bitterroot Natl. For.	12,000	111,140	111,140		
Garnet Range	30,000	162,120	162,120		
Flathead Natl. For.	235,000	23,320	22,270	550	500
Helena Natl. For.	530,000	583,040	462,810	46,300	73,930
Deerlodge Natl. For.	120,000	297,480	249,770	12,710	35,000
Beaverhead Natl. For.	Unknown	17,560	12,000	2,080	3,480
Gallatin Natl. For.	80,000	180,080	180,080		
Yellowstone Natl. Park	3,000	15,720	15,720		
Lewis & Clark Natl. For.	100,000	194,790	190,040	2,530	2,220
Glacier Natl. Park	1,000	Declined			
Sub-totals	1,112,600	1,632,610	1,453,310	64,170	115,130
Totals	1,166,000	1,901,050	1,696,470	72,570	132,010

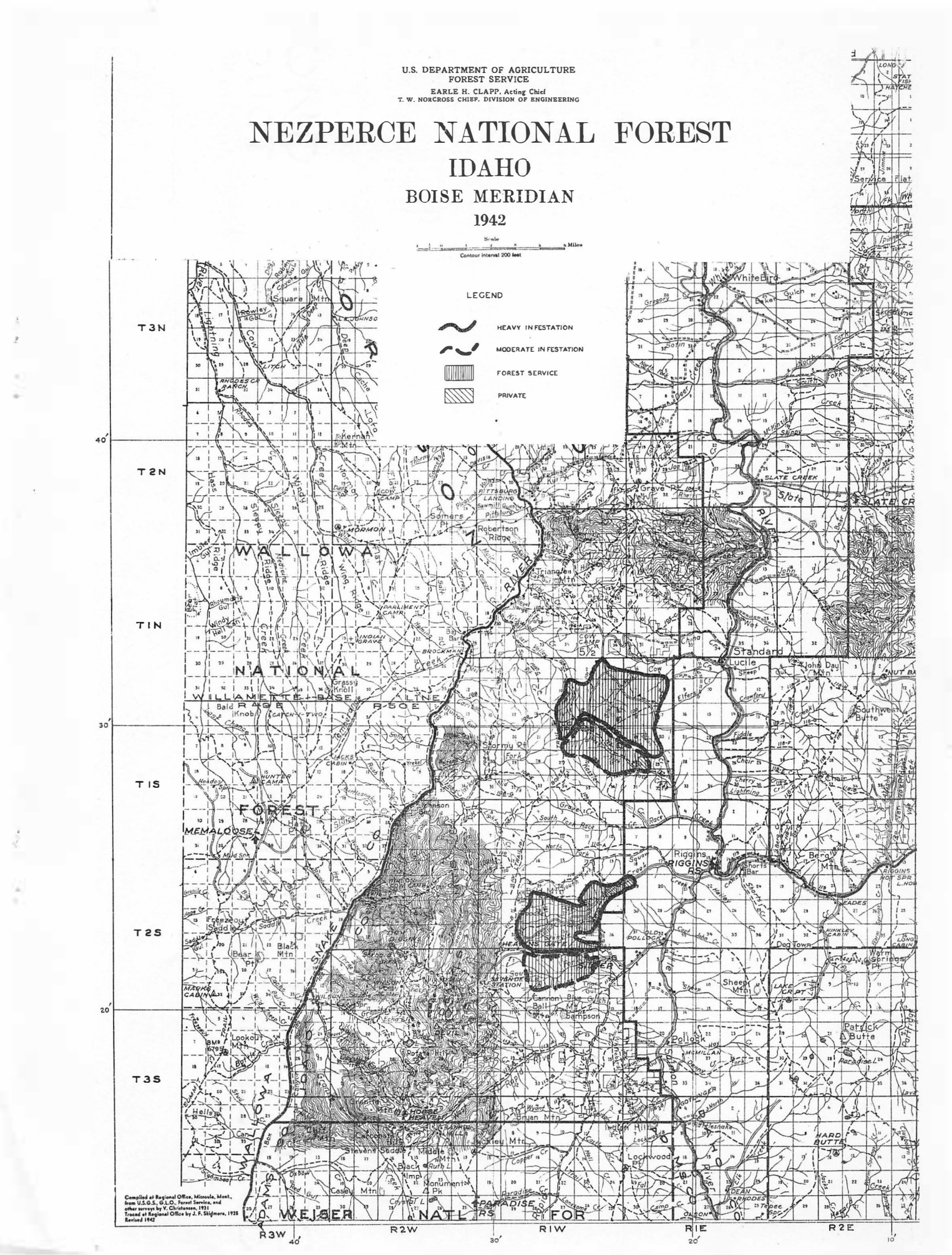
Table 2. Proposed 1953 Spruce Budworm Control Project by Ownerships.

National Forest and Control Units	Ownership								Grand Total
	Forest Ser.		Pub. Domain		Private		State		
	Acres	Per Cent	Acres	Per Cent	Acres	Per Cent	Acres	Per Cent	Acres
HELENA									
1. Continental Divide-East Slope	30,514	28	21,576	20	54,490	50	2,400	2	108,980
2. Big Belt Mts.	10,130	90			1,120	10			11,250
Total	40,644		21,576		55,610		2,400		120,230
DEERLODGE									
1. Boulder	29,670	73	5,120	12	5,950	15	60		40,800
2. Whitehall	6,770	98			140	2			6,910
Total	36,440		5,120		6,090		60		47,710
NEZPERCE									
1. Salmon River	15,206	99			154	1			15,360
GRAND TOTAL	92,290	50	26,696	15	61,854	34	2,460	1	183,300

U.S. DEPARTMENT OF AGRICULTURE
FOREST SERVICE
EARLE H. CLAPP, Acting Chief
T. W. NORCROSS CHIEF, DIVISION OF ENGINEERING

NEZPERCE NATIONAL FOREST
IDAHO
BOISE MERIDIAN
1942

Scale
Miles
Contour interval 200 feet



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FOREST SERVICE
LYLE F. WATTS, CHIEF
R. W. BOROHOLME, CHIEF, DIVISION OF MAPS AND PRINTING

HELENA NATIONAL FOREST
MONTANA
PRINCIPAL MERIDIAN, MONTANA

1947

Scale
Contour interval 200 feet

MAP SHOWING AREA OF SPRUCE BUDWORM INFESTATION PROPOSED FOR TREATMENT IN 1953 ON THE HELENA AND DEERLODGE FORESTS BY OWNERSHIP

LEGEND

- HEAVY DAMAGE
- MODERATE DAMAGE
- FOREST SERVICE
- PUBLIC DOMAIN
- STATE
- PRIVATE

Caution: The accuracy of this map is unknown since compiled from sources of unknown accuracy

Agriculture—Missoula

BRITISH COLUMBIA

ALBERTA

CANADA

UNITED STATES

COLVILLE

KANIKSU

KOOTENAI

GLACIER NATIONAL PARK

BLACKFEET INDIAN RESERVATION

FLATHEAD

LEWIS AND CLARK

COEUR D'ALENE

CABINET

THOMPSON FALLS

SPOKANE

SANDPOINT

LIBBY

KALISPELL

COLUMBIA FALLS

WHITEFISH

Glacier Park

Cutbank

Chester

Chinook

Havre

Shelby

Conrad

Valier

Pendroy

Agawam

Choteau

Fort Benton

Big Sandy

Winifred

GREAT FALLS

Augusta

Sun River

Teton River

Marias River

Missouri River

Sandcoulee

Stockett

Belt

Armington

Cascade

Stanford

Lewistown

Moccasin

Judith Gap

Harlowton

Hedges

Twodot

Ryegate

Roundup

Musselshell River

Big Spring Creek

Neihart

Kings Hill

Belt Creek

Belt Mtns.

Wolf Creek

Craig

Meridian

MONTANA

ST JOE

CLEARWATER

LOLO

MISSOULA

Clearwater River

Lolo Creek

Lolo Hot Springs

Bonita

Florence

Stevensville

Hamilton

Darby

Sula

Lochsa

Selway River

Moose Creek

Bitterroot River

BITTERROOT

HELENA

Deer Lodge

Philipsburg

Southern Cross

Anaconda

Butte

Lombard

Wilsall

Menard

Three Forks

Whitehall

Logan

Townsend

Toston

Ringling

Clarkia

Avery

Superior

Iron Mountain

Quartz

Arlee

Evaro

Frenchtown

Alberton

Ovando

Wolf Creek

Craig

Sunset

Potomac

DeSmet

Dixon

Ravalli

St Regis

Paradise

Osborgia

Big Prairie

Gordon Creek

Big Blackfoot River

Blackfoot River

Clearwater River

Clearwater Canyon

Cedars

Red Ives

Houndtop Lkt.

Secesh Summit

Secesh River

Iron Mountain

Quartz

Clark Fork River

Clark Fork

Flathead River

Flathead Lake

Swan River

Swan Range

Mission Range

Whitefish Range

Whitefish

Columbia Falls

Coram

Nyack

Belton

Summit

Essex

Marion

Somers

Big Fork

Polson

Big Arm

Elmo

Dayton

Pablo

Ronan

Niarada

Dixon

Stillwater

Reveli

Arlee

Evaro

Frenchtown

Alberton

Ovando

Sunset

Potomac

DeSmet

Clinton

Bonita

Florence

Stevensville

Lolo Hot Springs

Lolo Creek

Lochsa

Selway River

Moose Creek

Bitterroot River

Hamilton

Darby

Sula

Deer Lodge

Philipsburg

Southern Cross

Anaconda

Butte

Lombard

Wilsall

Menard

Three Forks

Whitehall

Logan

Townsend

Toston

Ringling

Rapelje

Big Timber

Columbus

Absarokee

Reedpoint

Livingston

Bozeman

Salesville

Avery

Norris

Sappington

Waterloo

Twin Bridges

Melrose

Wisdom

Gibbonsville

Jackson

Sheridan

Alder

Virginia City

Nevada City

Ennis

Madison River

Gallatin River

Gallatin

Gallatin Range

Absaroka Range

Custer

Billings

Grid

Red Lodge

Bear Creek

Rock Creek

Crane Pk

Cooke

Garfield

Smith

Wall Creek

Armstead

Dillon

Salmon

Bannock

Big Hole River

Big Hole

Beaverhead River

Beaverhead

Ruby River

Ruby Range

Red Rock River

Red Rock Lakes

Lima

Monida

Gilmore

Dubois

Targhee

Helgren Lake

Canyon

West Yellowstone

Yellowstone National Park

Yellowstone Lake

Old Faithful

Continental Divide

Shoshone

Teton

Big Hole Mountains

Big Hole Basin

Big Hole Pass

Big Hole Mtns.

Big Hole Creek

Big Hole River